

## **REMARKS/ARGUMENTS**

### **I. General Remarks**

Please consider the application in view of the following remarks.

### **II. Disposition of Claims**

Claims 2, 3, 12-14, 16-18, 20-22, 24-26, 28-30, 32, and 34 are pending in this application.

In this Response, all of these pending claims 2, 3, 12-14, 16-18, 20-22, 24-26, 28-30, 32, and 34 are amended.

### **III. Nonstatutory Obviousness-Type Double Patenting Rejections**

The Examiner has rejected claims 2-3, 12-14, 16-18, 20-22, 24-26, 28-30, 32 and 34 on the ground of nonstatutory, obviousness-type, double patenting “as being unpatentable over claims 1-11 of U.S. Patent No. 6,870,026.” Applicant has filed herewith a terminal disclaimer respecting that patent, thereby rendering this rejection moot.

### **IV. Rejection of Claims under 35 U.S.C. § 102(b), or in the alternative, under 35 U.S.C. §103(a)—JP 08012631**

The Examiner has rejected claims 2-3, 32, and 34 under 35 U.S.C. 102(b) as anticipated by or in the alternative under 35 U.S.C. 103(a) as obvious from JP 08012631. Specifically, the Examiner has stated that:

The reference discloses production of iminodisuccinic acid and its alkali metal salt, form maleic acid haft ester, ammonia, or maleic acid haft ester, and an aspartic acid [0001] and a biodegradable chelating agent (see Title). The disclosure of the reference differs from the instant claims in that it does not disclose the claimed formulas. However, the reference does disclose the claimed requirements. Therefore, the claimed formulas must be considered inherent in the prior art. [citation omitted].

Applicant respectfully traverses these rejections. Applicant also respectfully submits that by definition of “inherent,” an “inherent” formula cannot be known or obvious, and so the

claimed formulas cannot possibly be alternatively inherent or obvious. If the formulas were known, Applicant respectfully submits, then the anticipation would be simply anticipation, not inherent anticipation.

The law of inherency has recently been reviewed by noted intellectual property law scholars Dan Burk and Mark Lemley in an article entitled "Inherency," published at 47 William and Mary Law Rev. 371-411 (2005). Professors Burk and Lemley note that "inherency is perhaps the most elusive doctrine in all of patent law." However, they advise that confusion is not necessary and that the inherency cases are all ultimately about whether the public already gets the benefit of the claimed invention or element. If they do, then the invention is inherent in the prior art, even if the public does not know why. However, if the public does not already benefit from the invention, there is no inherency. The key to understanding inherency is to focus on public benefit.

Further, the Federal Circuit has stated that an inherent disclosure, to be invalidating as an "anticipation," is a disclosure that is necessarily contained in the prior art, and would be so recognized by a person of ordinary skill in that art. Continental Can Co. USA, Inc. v. Monsanto Co., 948 F.2d 1264, 1268-69, 20 U.S.P.Q.2D (BNA) 1746, 1749-50 (Fed. Cir. 1991). "Inherency" charges the inventor with knowledge that would be known to the art, although not described. The theory of inherent anticipation serves to accommodate "situations where the common knowledge of technologists is not recorded in the reference; that is, where technological facts are known to those in the field of the invention, albeit not known to judges." *Continental Can Company USA v. Monsanto Company*, 948 F.2d 1264, 1269 (Fed. Cir. 1991). Inherency is not a matter of hindsight based on the applicant's disclosure: the missing claim elements must necessarily be present in the prior art.

Statements in the claims that define and limit the invention are material limitations, for purposes of infringement and for purposes of distinguishing from the prior art. *In re Stencel*, 828 F.2d 751, 754-55, 4 U.S.P.Q.2D (BNA) 1071, 1073 (Fed. Cir. 1987).

**It is error to state that advantages recited in the claims can not impart patentability.**  
The advantages of an invention are often relied on to support patentability; whether they are included in the claim depends on a variety of factors, and is not the subject of a rigid rule. **Since Applicants' claimed invention is not described in a single prior art reference, it is not "anticipated."** *Rowe v. Dror*, 1122 F.3d 473, 478-79; 42 U.S.P.Q.2d 1559, 1553-54 (Fed. Cir. 1997). **The public does not have the benefit of Applicants' invention without Applicants' invention and teachings.**

The JP reference cited by the Examiner does not teach or suggest, and moreover does not provide for, use of the chelating agents in the form necessary for use in fertilizers. Only Applicant teaches fertilizers employing the chelating agents that may be applied directly to seed, to soil, and to plants.

Applicant himself cited and distinguished the JP reference in the specification of his pending application currently before the Examiner. In the section of the application titled "Relevant Prior Art" on page 4, at lines 5 – 18, Applicant stated:

Patent Application Publication No. JP8012631, of Yamamoto Hiroshi also teaches a procedure for production of iminodisuccinic acid and its alkali metal salt and a biodegradable chelating agent containing the same. In this procedure, a tetraalkali metal salt of iminodisuccinic acid is obtained by adding a half ester of maleic acid to aspartic acid or ammonia under an alkaline condition followed by hydrolysis and evaporation to dryness. A second objective iminosuccinic acid is obtained by the above addition reaction followed by **hydrolysis** and then addition of sulfuric acid (without conducting an evaporation to dryness). In these processes, use of L-aspartic acid in place of the ordinary aspartic acid is said to produce D,D-form-free iminodisuccinic acid and a tetraalkali metal salt thereof. Alternatively, L,L-iminodisuccinic acid is said to be selectively obtained by prior crystallization and/or washing of a mixture of the L,L-form and D,D-form of iminodisuccinic acid or a

tetraalkali metal salt thereof. The other "objective biodegradable chelating agent" is said to contain, as the active ingredient, the D,D- form-free iminodisuccinic acid and/or an alkali metal salt thereof.

That is, the JP reference fails to solve the problem for chelating agents used in agriculture. That is, in agriculture, the chelating agent must keep the metal ion in solution upon the addition of phosphate fertilizers. Applicant understood this problem and addressed it on pages 8-9 of his specification as follows:

Notwithstanding these various known procedures, prior art systems involving succinic acids, when used for chelation have failed to achieve their assumed bonding potential, rendering prior art compounds less attractive as chelating agents in the fertilizer market place. A reference by T.N. Polynova, L.A. Zassourskaya and M.A. Porai-Koshits, entitled, "Crystal Structures of d-Transition Metal Complexes with Iminodisuccinic Acid," published by the Chemical Department, Moscow State University, Moscow, 119899, Russia discusses the problem.

This Poynova et al. reference teaches that "in complexation with d-transition metals, the ligand-iminodisuccinic acid (H4ids) does not realize all its coordination possibilities in any of the complexes studied by X-ray analysis. Potentially, the H4ids ligand is pentadentate, but in compounds  $[\text{Co}(\text{H}_2\text{O})_6][\text{Coids}(\text{en})]_2 \cdot 4\text{H}_2\text{O}$  (I) and  $[\text{ZnH}_2\text{ids}(\text{H}_2\text{O})_2]$  (II) ids4- and H2ids2-ligands are tetradentate regardless of the differences in aprotonization, stoichiometric composition and valent state of complexing atoms. The coordination of Co(III) and Zn(II) in the form of a distorted octahedron is made up of the N-atom and three O- atoms of the H4ids ligand as well as of two N-atoms of the en ligand or two water molecules in I and II respectively. Hence, the three metallocycles are formed as one  $[[\beta]]$ -carboxyl branch [which] remains uncoordinated by the metal (aprotonized in I and protonized in II). In I an intramolecular H-bond is formed between the free  $[[\beta]]$ -carboxyl and the amino group of ethylene-diamine. In II the intramolecular H-bond is not formed: H-atoms (one of them connected with N, another, with the O-atom of the uncoordinated  $[[\beta]]$ -carboxyl group) form intermolecular H-bonds".

The prior art teaches that while the Iminodisuccinates have value, they fail to provide adequate chelation of metal ions, particularly for uses such as in phosphate fertilizer solutions. Such failure stems from several qualities of the compound. The most efficacious of chelation compounds have at least six nonbonded electron pairs; and most mineral ions share a coordination number of six. Because some isomers of Iminodisuccinate are

tetradente, the complexes are vulnerable to carbonate, hydroxide, and phosphate participation in the complex and such complexes are insoluble. Further, iminodisuccinic isomers have the ability to donate four electron pairs, and with the prior art methods of synthesis, there are a number of isomers that can not provide five pairs because of bond strain or bond angle limitations. Iminodisuccinate is mostly found as a tetradente-chelating agent. Being tetra dente prevents the compound from being suitable as a commercial chelating agent for use in agriculture and industry, and particularly for example in phosphorus fertilizers.

The JP reference proposes methods using specific aspartic acid isomers as starting material. to eliminate unwanted isomer production. The JP reference then adds techniques to separate and isolate the product compounds either through hydrolysis and separation or “prior crystallization and/or washing of a mixture of the L,L-form and D,D-form of iminodisuccinic acid or a tetraalkali metal salt.”

The condition of using a specific isomer for the aspartic acid renders the JP reference system unviable in a commercial sense. In distinct contrast, Applicant’s invention as claimed does not require a conditional isomer. The economic cost of the selected aspartic acid isomer of the JP reference, the cost of the separation techniques, and failure of the product compounds’ ability to fully envelop the metal ions and prevent the phosphate precipitates, prevents the JP reference from providing a useful compound for the fertilizer and agriculture industries.

The Examiner summarily indicates that the JP reference calls for some “similar conditions” shown to be effective in a “similar system” and therefore would inherently have properties within the scope of Applicants’ invention. However, the law is well established that anticipation cannot be based on conjecture. For anticipation, “a single prior art reference

must expressly or inherently describe each and every limitation set forth in the patent claim.”

For inherent anticipation, the missing descriptive material or inherent property must be “necessarily present” in the prior art and “must be so recognized by persons of ordinary skill in the art.” *E.g., Trintec Industries, Inc. v. Top-U.S.A. Corp.*, 295 F.3d 1292 (Fed. Cir. 2002); *Hitzeman v. Rutter*, 243 F.3d 1345 (Fed. Cir. 2001). See MPEP § 2144.03, citing *In re Zurko*, 258 F.3d 1379, 1385, 59 U.S.P.Q.2d 1693, 1697 (Fed. Cir. 2001) (“[T]he Board cannot simply reach conclusions based on its own understanding or experience—or on its assessment of what would be basic knowledge or common sense. Rather, the Board must point to some concrete evidence in the record in support of these findings.”) Conclusory statements do not fulfill the Examiner’s obligations. See *In re Lee*, 277 F.3d 1338, 1344-45, 61 U.S.P.Q.2d 1430, 1434-35 (Fed. Cir. 2002). Further see MPEP § 2144.03(A), citing among other cases, *In re Eynde*, 480 F.2d 1364, 1370, 178 U.S.P.Q. 470, 474 (CCPA 1973), noting that the court rejected “the notion that judicial or administrative notice may be taken of the state of the art. The facts constituting the state of the art are normally subject to the possibility of rational disagreement among reasonable men and are not amenable to the taking of such notice.”

The JP reference cited by the Examiner discloses methods of making chelating agents but no method disclosed contains every element as taught by Applicant and no mention is made of the product chelating agent having utility in a fertilizer or chelation ability as discussed above as necessary for utility as a fertilizer. Any one such distinction alone should be sufficient to distinguish the JP reference as an anticipatory reference, as the JP reference fails to have identity with each element in Applicant’s claims as required for anticipation.

Applicant respectfully submits that the JP reference does **not** have the necessary elements for anticipation and does **not** give the public the benefit of Applicants’ invention. Moreover,

Applicant respectfully submits that the JP reference lacks sufficient teaching to render Applicant's invention obvious as claimed.

**V. Rejection of Claims under 35 U.S.C. § 103(a)—JP 08012631**

The Examiner has rejected claims 12-14, 16-18, 20-22, 24-26, and 28-30 under 35 U.S.C. 103(a) as obvious from JP 08012631. The Examiner has noted that the claims are product by process and that the reference discloses a chelating composition. Further, the Examiner has stated:

The disclosure of the reference differs from the instant claims in that it does not disclose specific steps of the processes, as in the claims. However, it does disclose similar conditions to form the products (see [0008]-[0047] and in the Examples). Therefore, it would have been obvious to one of ordinary skill in the art to modify the conditions from the reference within the limitations of the claimed product by process since they have been shown to be effective in a similar system and thus would have been expected to provide adequate results, iminodisuccinic acid or a salt thereof of the claimed formulas, in the absence of a showing of unexpected results derived from said modification.

Applicant respectfully traverses the Examiner's rejections. Applicant respectfully submits that the JP reference provides no teaching or suggestion of a fertilizer useful for application to soil, seeds and plants as claimed by Applicant and no teaching or suggestion of the effectiveness of the fertilizer as claimed by Applicant.

Applicant specifically discusses in his specification prior art systems involving succinic acid which when used for chelation have failed to achieve their assumed bonding potential, rendering the prior art compounds less attractive as chelating agents in the fertilizer market. On page 8 of his specification, Applicant states:

Thus, the prior art teaches that while the Iminodisuccinates have value, they fail to provide adequate chelation of metal ions, particularly for uses such as in phosphate fertilizer solutions. Such failure stems from several qualities of the compound. The most efficacious of chelation compounds have at least six nonbonded electron pairs; and most mineral ions share a coordination number of six. Because some isomers of Iminodisuccinate are tetradente, the complexes are vulnerable to carbonate, hydroxide, and, phosphate participation in the complex and such complexes are insoluble. Further,

iminodisuccinic isomers have the ability to donate four electron pairs, and with the prior art methods of synthesis, there are a number of isomers that can not provide five pairs because of bond strain or bond angle limitations. Iminodisuccinate is mostly found as a tetradente-chelating agent. Being tetra dente prevents the compound from being suitable as a commercial chelating agent for use in agriculture and industry, and particularly for example in phosphorus fertilizers.

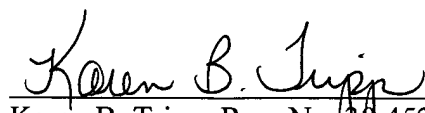
The Examiner has not provided support for his position that it would be obvious from the JP reference that Applicant's invention would perform as Applicant claims, rather than as taught in the prior art. Applicant further discusses the JP reference above in discussing the Examiner's rejections based on § 102 or in the alternative § 103 and Applicant respectfully requests the Examiner consider that discussion further with respect to his rejections only under § 103.

### SUMMARY

Applicant respectfully requests that the Examiner reconsider his rejections. The claims as amended are now believed in condition for allowance and the Examiner is requested to allow the application to proceed to issue.

Respectfully submitted,

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